

## WHAT IS CLAIMED IS:

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- 5 1. A method performed by a computer for computing modified discrete cosine transfer comprising the steps of:

computing 
$$x(k) = \begin{cases} [-y(26-k) - y(27+k)] \cdot b_k & \text{for } 0 \leq k \leq 8 \\ [y(k-9) - y(26-k)] \cdot b_k & \text{for } 9 \leq k \leq 17 \end{cases};$$

computing 
$$Y'(n) = \sum_{k=0}^{17} x(k) \cos\left[\frac{\pi}{36}(2k+1)n\right] \text{ for } 0 \leq n \leq 17;$$

defining  $Y(0) = Y'(0)/2$ ; and

computing  $Y(n) = Y'(n) - Y(n-1)$  for  $1 \leq n \leq 17$ .

- 10 2. An MPEG encoder/decoder comprising:

means for computing 
$$x(k) = \begin{cases} [-y(26-k) - y(27+k)] \cdot b_k & \text{for } 0 \leq k \leq 8 \\ [y(k-9) - y(26-k)] \cdot b_k & \text{for } 9 \leq k \leq 17 \end{cases};$$

means for computing 
$$Y'(n) = \sum_{k=0}^{17} x(k) \cos\left[\frac{\pi}{36}(2k+1)n\right] \text{ for } 0 \leq n \leq 17;$$

means for defining  $Y(0) = Y'(0)/2$ ; and

means for computing  $Y(n) = Y'(n) - Y(n-1)$  for  $1 \leq n \leq 17$ .

- 15 3. The encoder/decoder of claim 2, further comprising:

means for computing  $Y'(k) = Y(k) \cdot b_k$  for  $0 \leq k \leq 17$ ;

means for computing  $y'''(n) = \sum_{k=0}^{17} Y'(k) \cos\left[\frac{\pi}{2 \cdot 18}(2k+1)n\right]$  for  $0 \leq n \leq 17$  ;

means for computing  $y'(n) = \begin{cases} y'''(n+9) & \text{for } 0 \leq n \leq 8 \\ 0 & \text{for } n = 9 \\ -y'''(27-n) & \text{for } 10 \leq n \leq 26 \\ -y'''(n-27) & \text{for } 27 \leq n \leq 35 \end{cases}$  ;

means for defining  $y(0) = \sum_{k=0}^{18-1} Y(k) \cdot c_k$  ; and

means for computing  $y(n) = y'(n) - y(n-1)$  for  $1 \leq n \leq 35$ .

4. An electronic circuit for fast computation of modified inverse discrete cosine transform comprising:

a first circuit for computing

$$x(k) = \begin{cases} [-y(26-k) - y(27+k)] \cdot b_k & \text{for } 0 \leq k \leq 8 \\ [y(k-9) - y(26-k)] \cdot b_k & \text{for } 9 \leq k \leq 17 \end{cases}$$

a second circuit for computing  $Y'(n) = \sum_{k=0}^{17} x(k) \cos\left[\frac{\pi}{36}(2k+1)n\right]$  for  $0 \leq n \leq 17$  ;

a third circuit for defining  $Y(0) = Y'(0)/2$  ; and

a fourth circuit for computing  $Y(n) = Y'(n) - Y(n-1)$  for  $1 \leq n \leq 17$ .

5. A method performed by a computer for computing modified inverse discrete cosine transform comprising the steps of:

computing  $Y'(k) = Y(k) \cdot b_k$  for  $0 \leq k \leq 17$  ;

computing  $y''(n) = \sum_{k=0}^{17} Y'(k) \cos\left[\frac{\pi}{2 \cdot 18}(2k+1)n\right]$  for  $0 \leq n \leq 17$  ;

computing

$$y'(n) = \begin{cases} y''(n+9) & \text{for } 0 \leq n \leq 8 \\ 0 & \text{for } n = 9 \\ -y''(27-n) & \text{for } 10 \leq n \leq 26 \\ -y''(n-27) & \text{for } 27 \leq n \leq 35 \end{cases} ;$$

defining  $y(0) = \sum_{k=0}^{18-1} Y(k) \cdot c_k$  ; and

computing  $y(n) = y'(n) - y(n-1)$  for  $1 \leq n \leq 35$ .

6. An electronic circuit for fast computation of computing modified inverse discrete cosine transform comprising:

a first circuit for computing  $Y'(k) = Y(k) \cdot b_k$  for  $0 \leq k \leq 17$

a second circuit for computing  $y''(n) = \sum_{k=0}^{17} Y'(k) \cos\left[\frac{\pi}{2 \cdot 18}(2k+1)n\right]$  for  $0 \leq n \leq 17$

a third circuit for computing

$$y'(n) = \begin{cases} y''(n+9) & \text{for } 0 \leq n \leq 8 \\ 0 & \text{for } n = 9 \\ -y''(27-n) & \text{for } 10 \leq n \leq 26 \\ -y''(n-27) & \text{for } 27 \leq n \leq 35 \end{cases}$$

a fourth circuit for defining  $y(0) = \sum_{k=0}^{18-1} Y(k) \cdot c_k$  ; and

a fifth circuit for computing  $y(n) = y'(n) - y(n-1)$  for  $1 \leq n \leq 35$ .